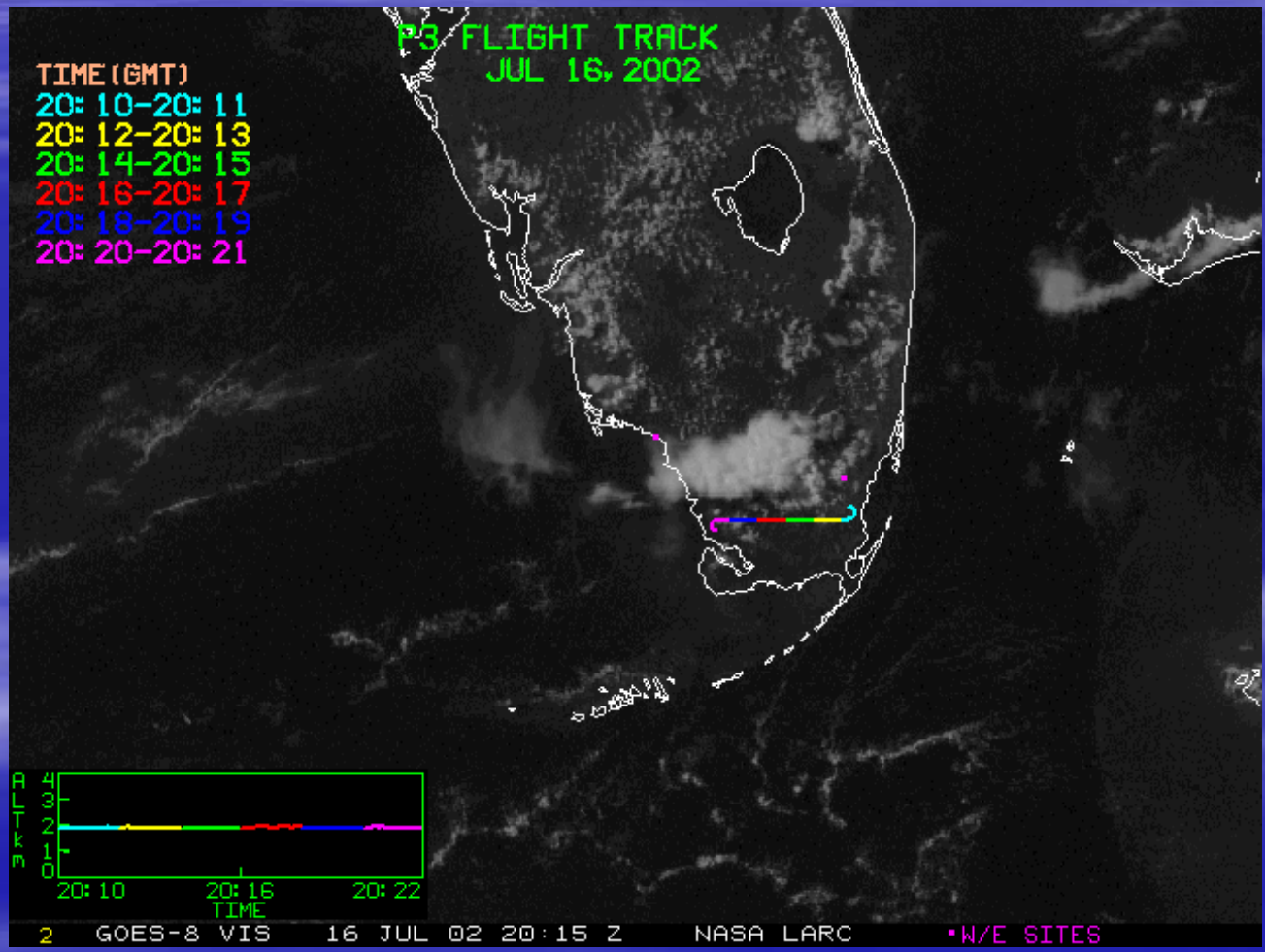
Convection Properties and Processes: Mass Budgets from ELDORA Observations

Kathleen G. Davison, J. Verlinde and W. Frank

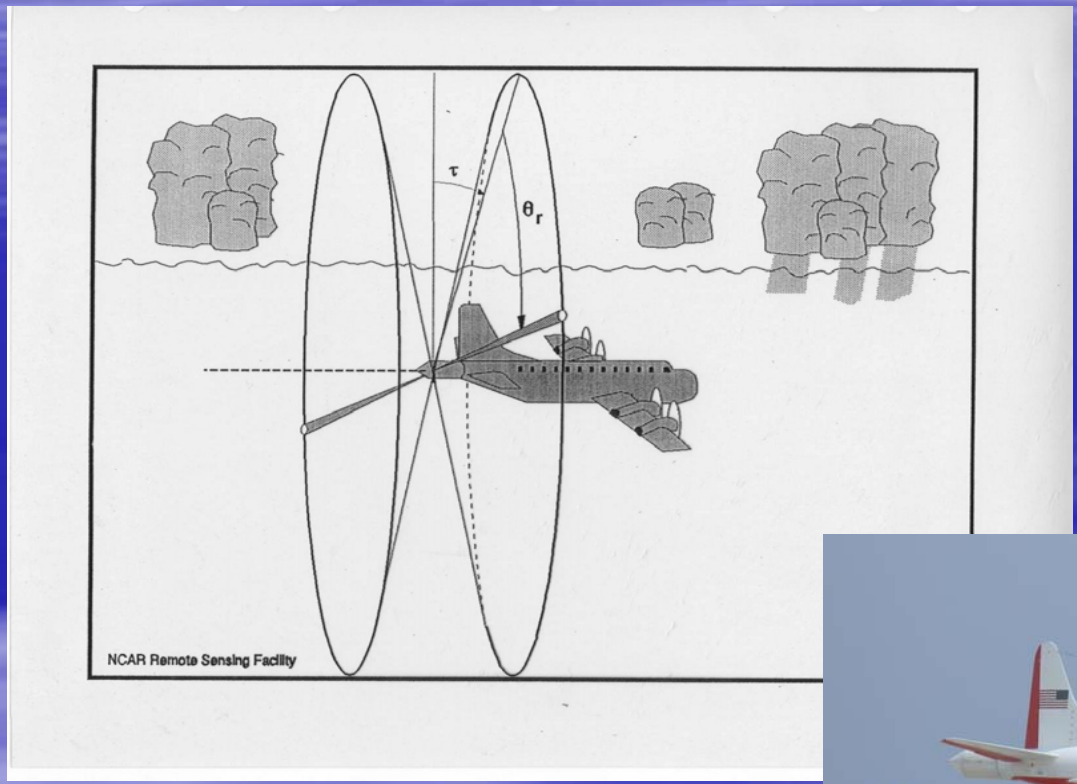
The Pennsylvania State University

Focus Case

7/16/02 Line 2



ELDORA Data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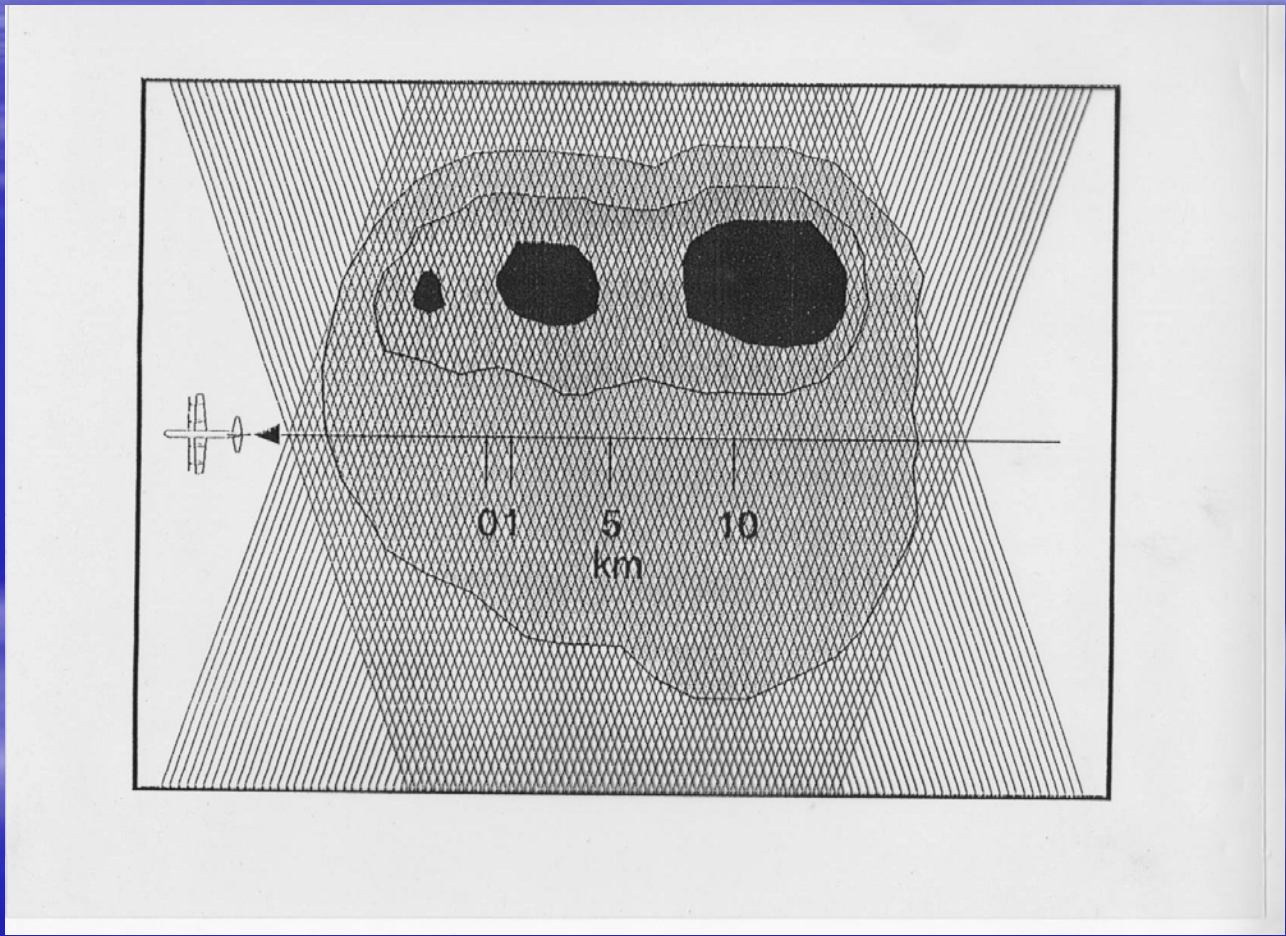
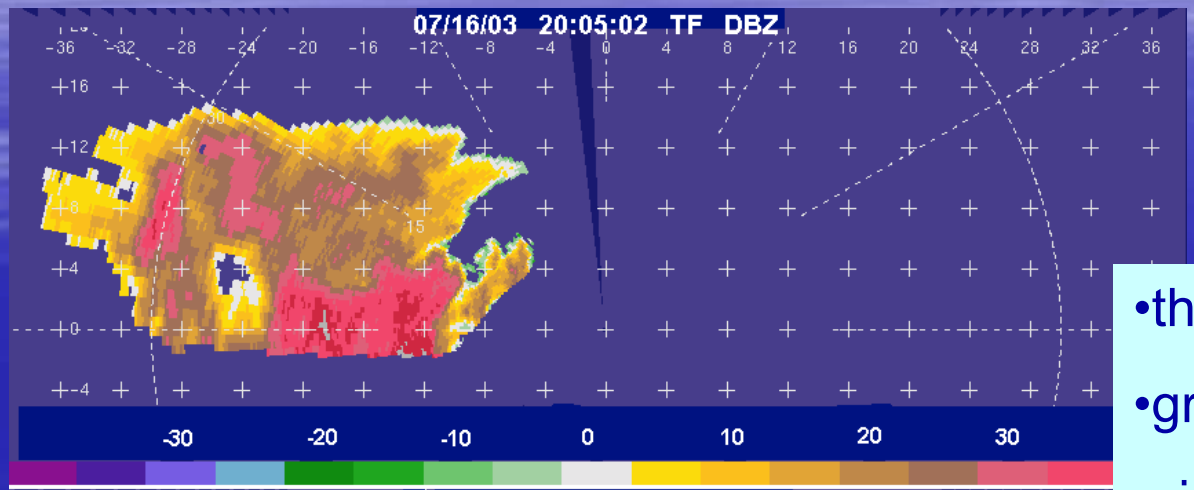
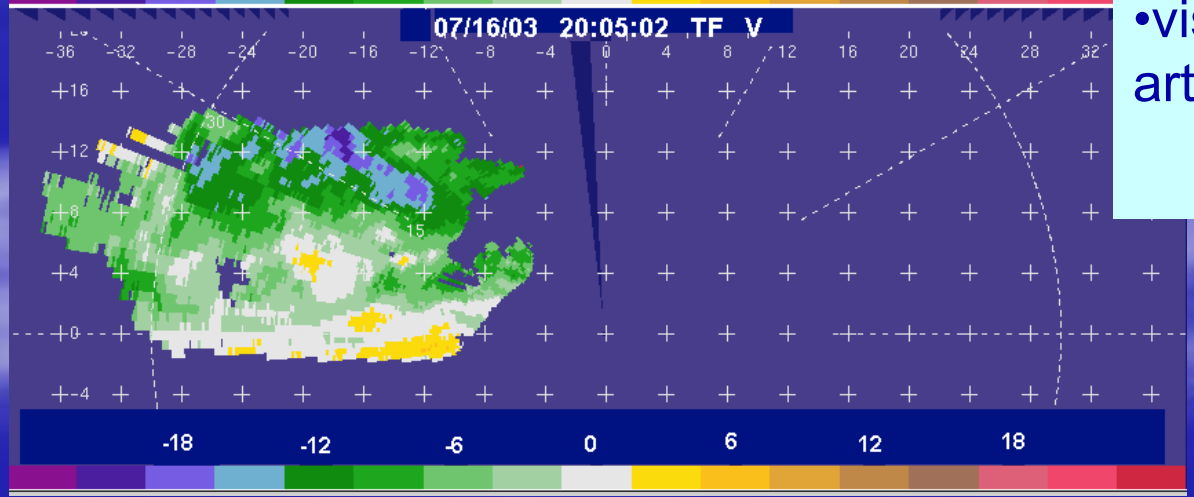
ELDORA Data



Data Analysis

Editing





- thresholded
- ground clutter removed
- visually inspected for artifacts

Data Analysis
Interpolation, Synthesis, & Output

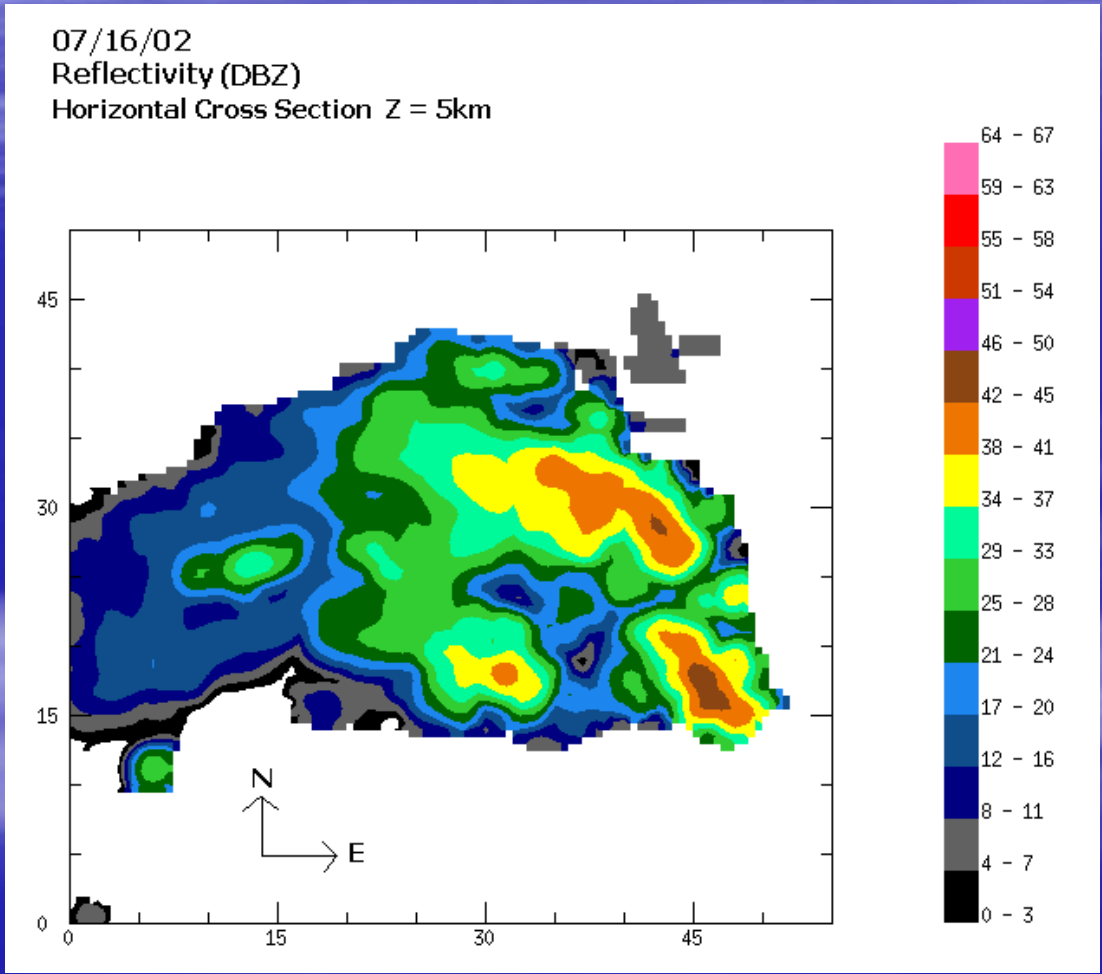
- Variational Method – developed by John Gamache (HRD)
- Problem – find 3D wind field
  1. Doppler radials difference equation
  2. Anelastic mass-continuity equation
  3. Filtering – second derivatives and cross derivatives

Cost Function

- Solution – minimize cost function

Data Analysis

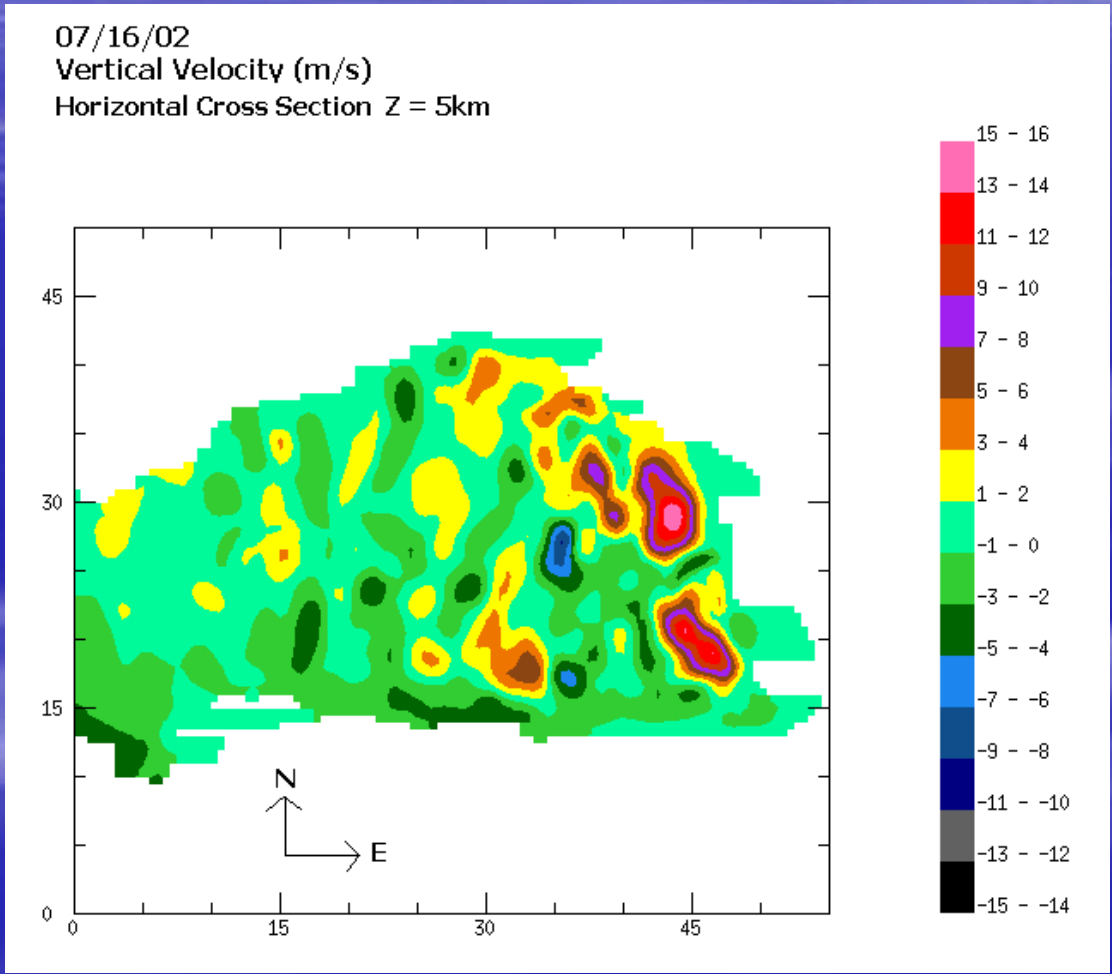
DBZ

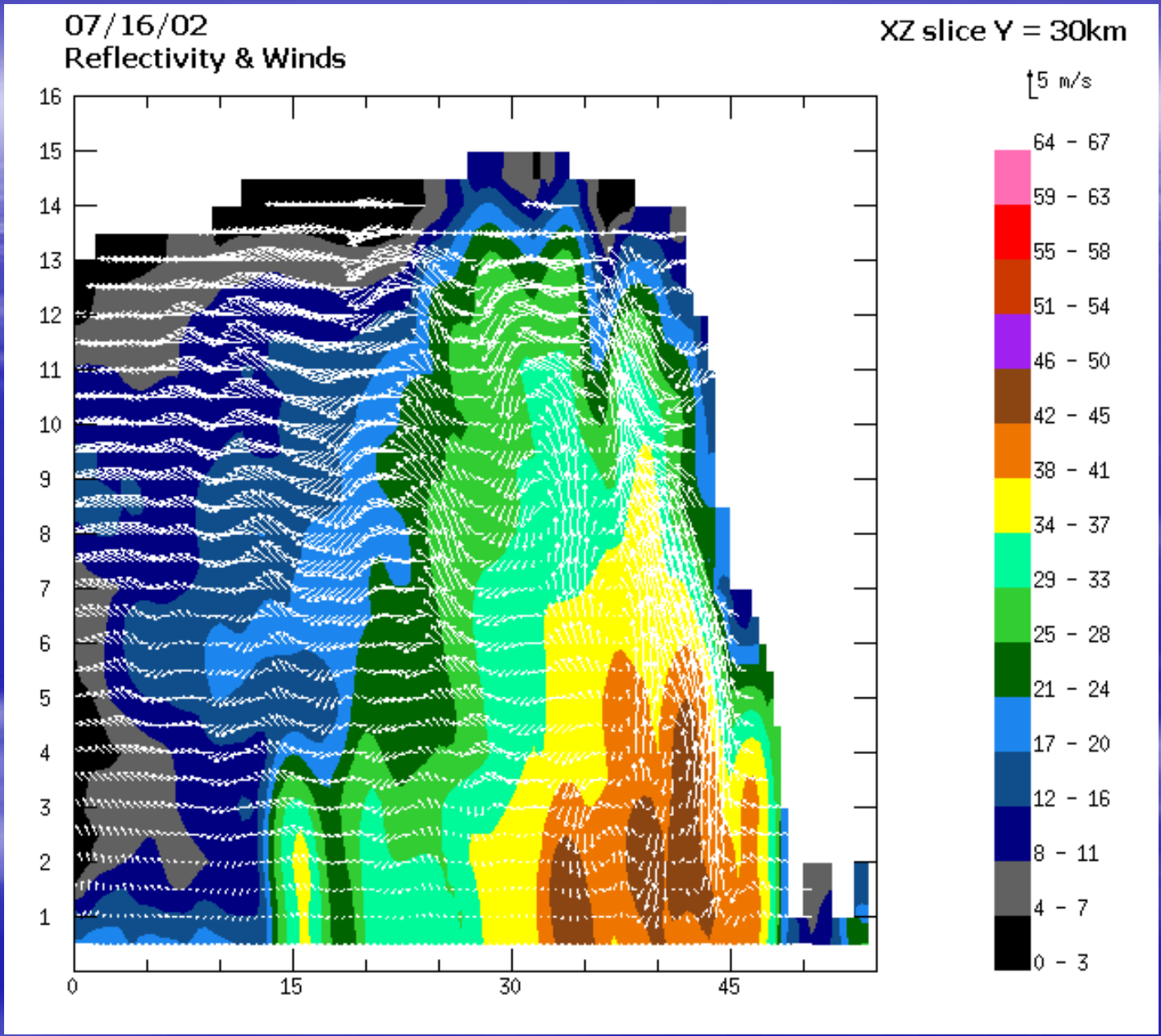


- Spatial resolution - .5km
- Temporal resolution ~ 10 min
- Domain – 55x50x16km

Data Analysis

Vertical Velocity

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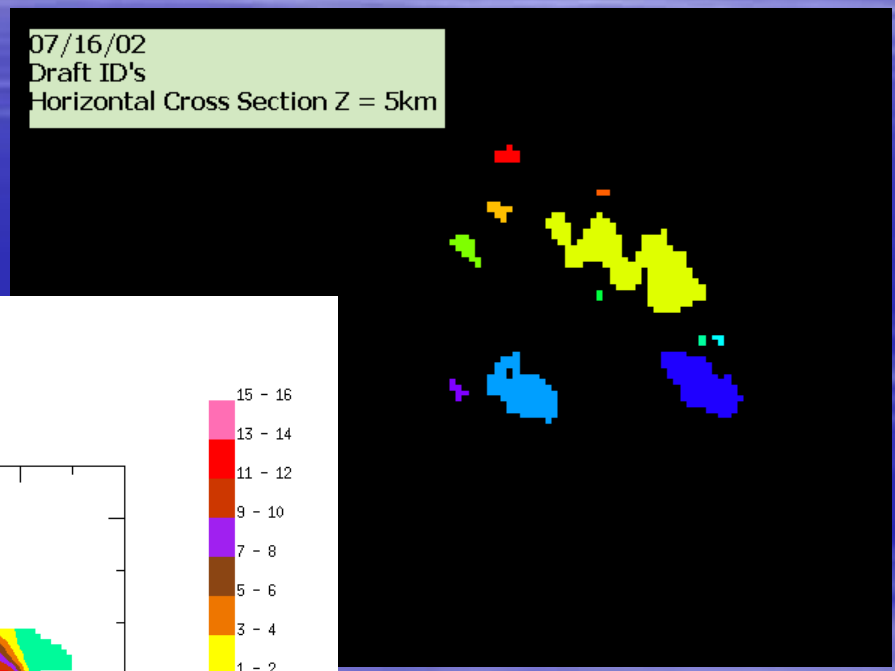
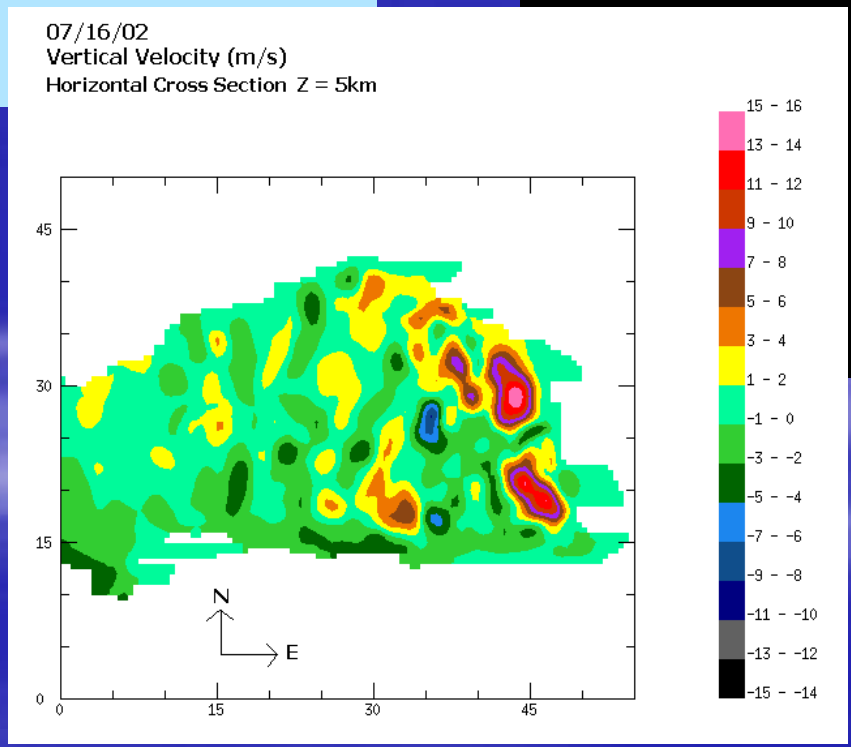
Reflectivity & Winds
XZ slice Y = 30km
5 m/s
64 - 67
59 - 63
55 - 58
51 - 54
46 - 50
42 - 45
38 - 41
34 - 37
29 - 33
25 - 28
21 - 24
17 - 20
12 - 16
8 - 11
4 - 7
0 - 3
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
15
30
45

Draft Analysis

Criteria

- Reflectivity > 30 DBZ
- W > +2 m/s
- A > .25 km^2





Results

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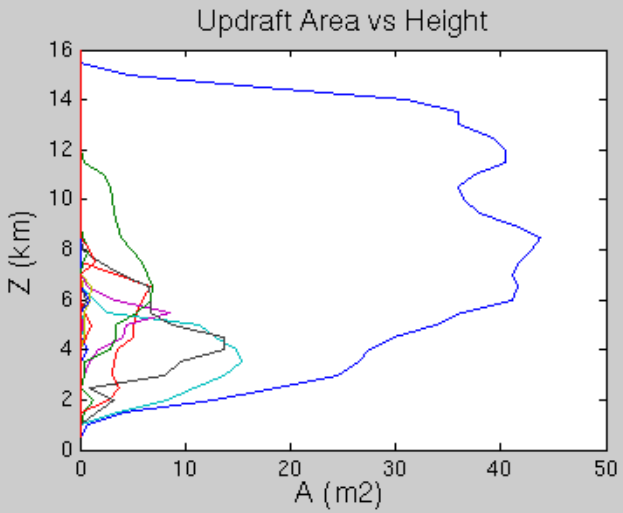
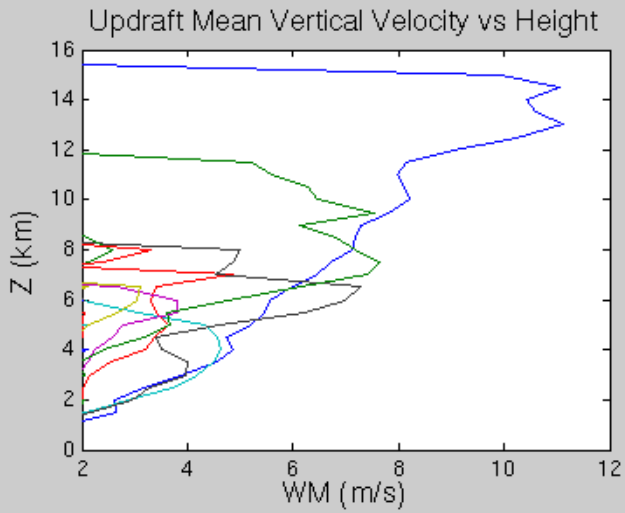
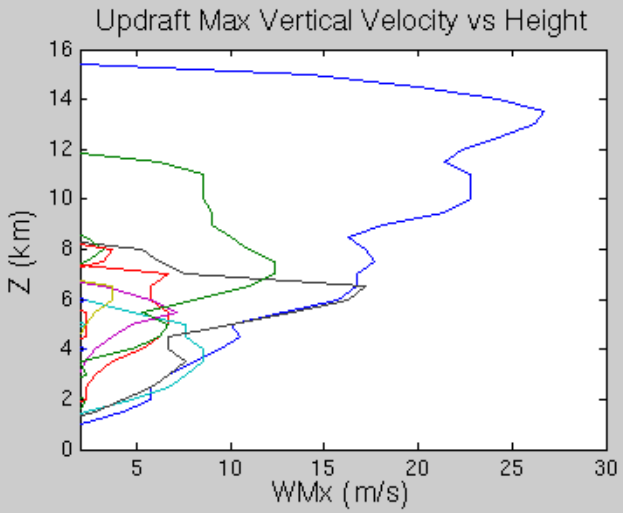
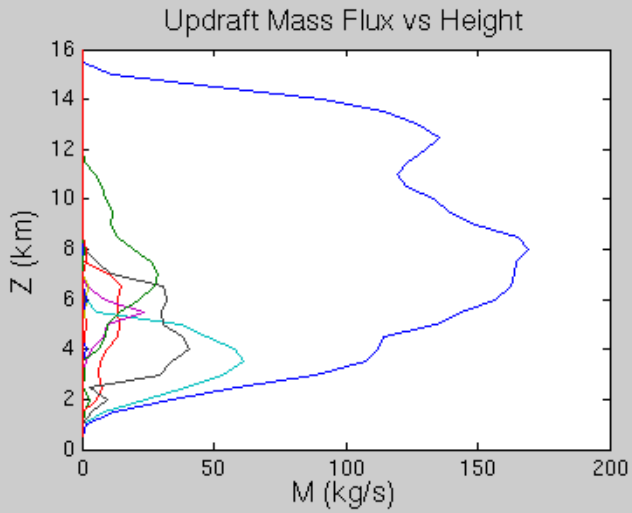




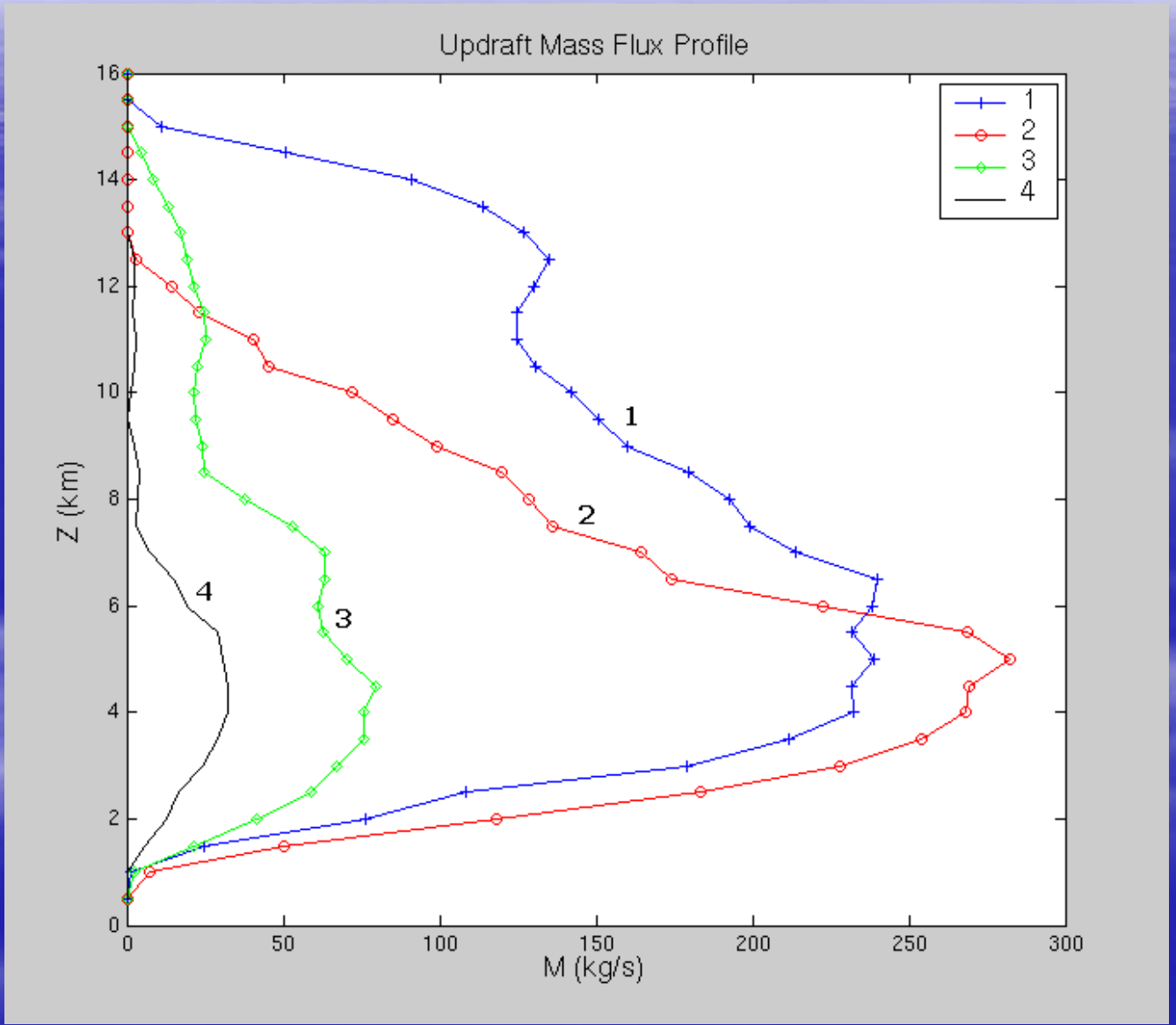




* different lines denote separate updrafts

Results

07/16/02 Line 2



Summary & Future Work

- A method has been developed for draft analysis.
- The method was tested on the previous convective case using arbitrary criteria.
- It will now be trivial to run the analysis on multiple cases using purposeful criteria to produce results.
- Some of our future cases will be:
  - Updrafts & Downdrafts – to obtain total convective mass flux
  - Anvils